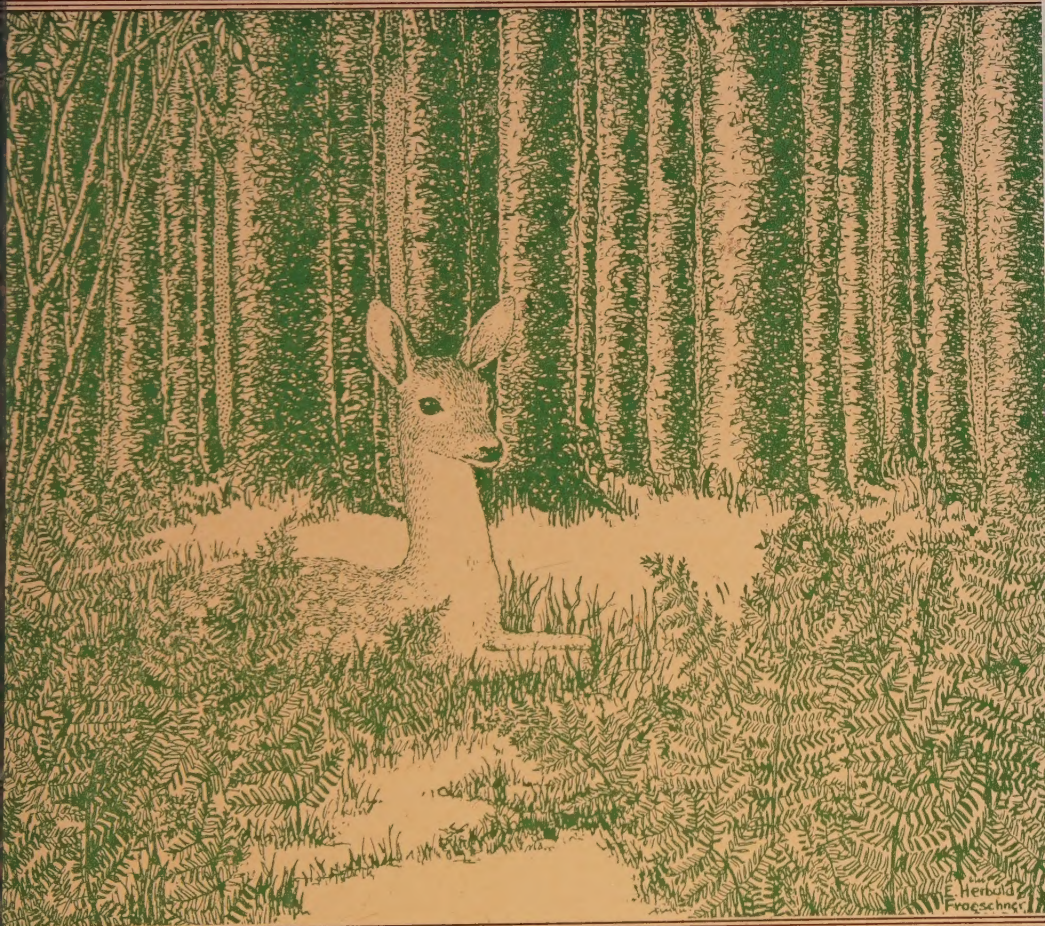


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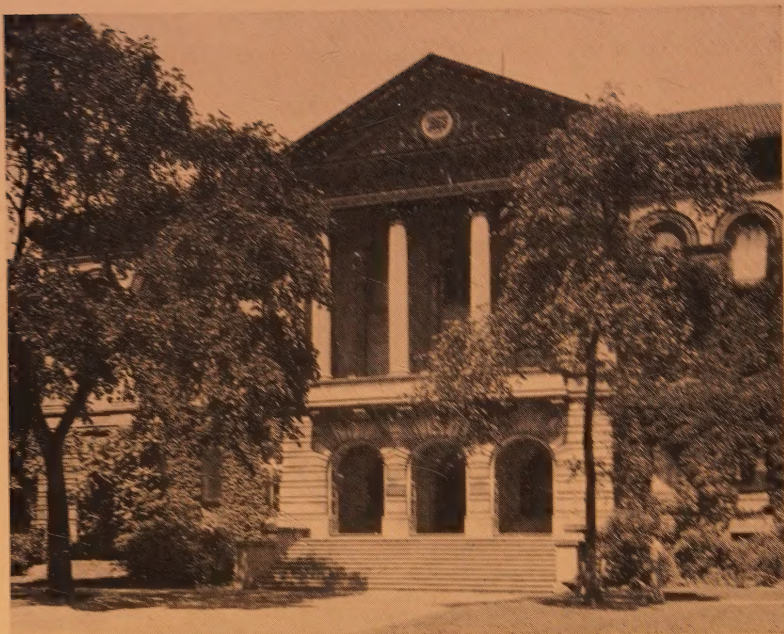
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# PEPOON

The cactus (e.g., *Opuntia Rafinesquii*), usually growing in orderly mats, covers acres with its weedy growth in drouth years. Grazing animals driven to securing nourishment from it suffer and sometimes die because they must eat also its treacherous spines.



# The Role of Weeds in Maintaining the Plains Grassland

ANNA PEDERSEN KUMMER\*

It is the custom to consider weeds either an abominable initial stage in plant succession or an evil interregnum in a disturbed climax. Some ecologists dignify dicotyledonous weeds by grouping them with forbs in general (Costello, 1944). It seems reasonable to give credit to weeds for the part they played in the perpetuation of the mean which is called the short grass formation. They profoundly influenced the edaphic and faunal factors interacting with the short grass. Descriptions of the plains made before the coming of the settler makes no mention of weeds and there is a tendency to assume that the formation was static. But there were dry periods which influenced the composition of the biome (plant-animal relationship) in accordance with Liebig's "law of the minimum" which states that growth is limited by the factor which is present in relative minimum.

It is reasonably contended that the short grass plains represent a true climax because the bison and other animal populations kept the grass constantly grazed to capacity (Larson, 1940). Peattie (1943) estimated the bison population at fifty million when the white man first occupied the continent, and Allred (1943) believes that there were probably thirty million antelope before man caused their depletion. The grazing pressure exerted by them was doubtlessly equivalent to that developed by present day domestic animals, since the food requirements and rate of increase are about the same. In the most recent drouth years this increase in population was suddenly much greater than the vegetation could carry, and the animals were prematurely disposed of. Starvation had the same effect upon the biome of bison days but before death overtook the animals they certainly consumed the last vestige of short grass. The soil was trampled and pulverized then no less than in recent years. There were enough bison in northeastern South Dakota to make trails which were obvious in the 90's. In 1910 the old trails could still be demonstrated in relict grassland.

The bison and other herbivores had no ever-constant granary by which they might survive the drouth; neither did our cattle in the 30's. Ancient loess mounds indicate that there were dust storms, that the soil moved then as it did more recently. And, judging from more recent experience with grass-eaters, the reduced and famished bison and antelope subsisted formerly upon the same plants as our cattle did more recently, namely, weeds. The bison appetite when near collapse was not more dainty than

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\*Honorary Curator of Botany, Chicago Academy of Sciences.

that of our cows that relish peppergrass (*Lepidium virginicum*) coming up with a summer shower after a rainless spring. Their calves did not object to the peppergrass taste in the milk; the predators and scavengers with their miserable litters reduced by malnutrition were not fastidious about the taste of the meat. The various species, though reduced in numbers, did survive, which is evidence that they could and did find some degree of use for the new forage. The choice of food of the quail changes as the seral stages of a succession go by (Cady, 1944). Human beings have found that weeds can supply necessary food, both micro- and macro-nutrients. The Japanese have investigated this recently (Fukai, 1940), primitive people came upon this knowledge empirically (Morris, 1943). Russian thistles as well as grama and buffalo grass are high in crude protein and carotene (Langham, *et al.*, 1943). Although Russian thistles were not contemporary with the bison in America, nevertheless it is not too much to assume that weeds of similar quality nourished these animals, for the composition of living matter reflects the character of the soil upon which it grows (Vinogradov, 1943). Weeds have been analyzed in terms of forage value and found not entirely worthless even in the presence of other forage (Costello, 1944). The dry weight of weeds in a drouth year has been found to be as great as the dry weight of short grass in pre-drouth years (Albertson and Weaver, 1944).

In Beal's classical experiment in Michigan, weed seeds were found to be viable after burial for fifty years (Darlington, 1931). This means that at all times there are available, especially in wind-blown soil, weed seeds which, relieved of the competition of perennial grasses, can germinate and grow under a great variety of edaphic, meteorological, and biotic circumstances. There is a delicate and little appreciated adjustment of weeds to their environment (Kummer, 1941). The combination of one set of environmental factors permits a certain species to germinate, grow through the seedling stage, flower, and fruit. Any slight modification of this complex interrupts the life cycle. In 1940, Spink County in South Dakota was virtually covered with red scale (*Atriplex rosea*), a plant new (?) to the locality. Its appearance seemed spontaneous, yet its seeds may have been lying in the soil for years, awaiting a suitable combination of dryness and daily temperature. In the exotic environment of cultivated plots in Chicago, the seeds failed to germinate until the spring of 1944, and the seedlings died with the third leaf. Probably there is never a dearth either in variety or number of weed seeds in the soil. It has been calculated that there is an average of nineteen million viable seeds per acre in permanent pastures in Quebec (Dore and Raymond, 1942).

Annuals are the earliest weeds to appear on the denuded soil. Weaver and Darland (1944) published a record of the weed population of vari-



ous short grass plains areas during the recent drouth. Presumably this period has been as severe as any that visited the plains in the bison era. They record peppergrass (*Lepidium densiflorum*), foxtail barley (*Hordeum jubatum*) and Pursh plaintain (*Plantago Purshii*) together with other weeds as the earliest plants to occupy lands recently laid bare by erosion. Their forage value is high. Other weeds are less palatable but for other reasons are important. Gumplant (*Grindelia squarrosa*) bides its time, does not germinate under litter, but covers denuded soil with standing-room-only abundance. Sunflowers (*Helianthus* spp.) and hairy golden aster (*Chrysopsis villosa*) are more tolerant of litter and help to bind the soil, adding their own coarse residue to its rebuilding. The short grasses do not directly benefit from their presence, in fact are unable to persist unless the tops of the weeds are cut (Riegel, 1943). When weeds are abundant, the grass-eaters are over hungry and will consume them. The very conditions which made it possible for them to appear carry concomitantly the means for checking them.

Biennials or winter annuals such as Canada fleabane (*Erigeron canadensis*) and narrowleaf whitetop (*Erigeron ramosus*) persist as unobtrusive rosettes, small or large as the season permits, but developing a penetrating root against the time when rainfall allows them to flower and fruit. They are not pleasant tasting but cattle will eat their succulent leaves in stubble, so doubtlessly did they serve the bison in other circumstances.

Buffalo grass and grama grass survive dust burial scarcely at all. The perennial weeds are not too much affected by some burial, merely sending out rhizomes at more advantageous levels. Western ragweed (*Ambrosia psilostachya*), goldenrod (*Solidago canadensis*), and gayfeather (*Liatris* spp.) carry on their frugal economy in years favorable to short grasses (which in a sense are poor years for them) and are thus equipped to take advantage of the changed dusted habitat.

While the weed cover seems a deterrent to successful reoccupation by the short grasses, it is actually necessary to that process. Dust bowl farmers witnessed the phenomenon of rains rolling from dust drifts like water from flour. Nor could the dust be wetted even by being under water for some time. Once there had been a growth of lamb's quarters (*Chenopodium album*), the soil was rendered porous, the roots made channels and their decay left wicks for conduction. The trash, if any remained, was a mulch and a fresh culture for soil organisms.

The fact that such animals as bison, coyotes, and prairie dogs persisted on the plains is not sufficient argument against the hypothesis that they too at times reached dangerous minima that bordered on extinction. The rabbit-lynx cycle in Canada illustrates the point. The reduction of the lynx population equates the reduced number of rabbits. During the "lean" years of any one species there must be a corresponding optimal

(in terms of competition at least) condition for the other side of the equation or other factors in the system. If there can be some use of an alternate factor by a species facing extinction, then there is no species loss. Certainly there must have been some substitution, some tremendous shifts, all through the integration, when the cataclysm of drouth, or years of poorly spaced rain, came to the plains. The factor which enabled the perpetuation of the system is no less important than that which supported it at what might be termed maximum expression. Hence it is fair to credit weeds, especially annuals, with being an integral part of the short grass plains, for without them the short grass could not have survived as a climax vegetation.

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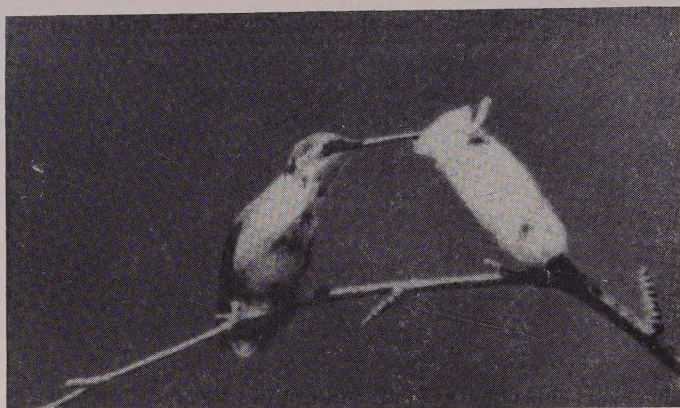
## *Test Your Nature Lore*

### BIRD-NAME QUIZ

Your ability to answer these questions does not depend upon a special knowledge of birds; only upon your familiarity with the names, common and colloquial, of North American species. You are asked, then, to supply a name in each case fitting the definition or the description. If you answer five correctly you are good; ten, excellent; more than ten, you *are* good.—E. R. Ford.

1. A female aborigine.
2. A difficult problem.
3. A waterfowl decoy.
4. A wise bird.
5. A sculptured figure.
6. A lone hand.
7. A church dignitary.
8. Suggesting a flirtation.
9. Suggesting a castigation.
10. Suggesting a divorce action.
11. Suggesting a friendly dog.
12. Two nouns, each suggesting gullibility.
13. Two nouns, each names of a mammal.
14. Two nouns, a natural phenomenon and a mechanical device.
15. Two nouns, each describing a weird sound.
16. It hangs by the old pump.
17. Motion, direction and topography give the hyphenated name of the \_\_\_\_\_.
18. Conversational.

*Answers on page 34.*



## More about Hummingbirds

SAMUEL A. HARPER\*

A summer in North Carolina offered unexpected opportunities for the study of our smallest bird, the ruby-throated hummingbird. We sometimes come to hasty conclusions about the extent of our knowledge of certain birds (or other things!) just because, perchance, they are familiar subjects which we have accepted as part of our general store of knowledge and to which we expect to add nothing in the future. But this is a mistaken attitude, at least with reference to birds. There is always something new to be learned about them, which careful and sustained observation is bound to reveal. This truth was once more demonstrated to me last summer as I learned something new about our old friends, the hummingbirds.

The "hummers" are perhaps the most remarkable group of birds in the entire world, and they are found only in the Americas. The ruby-throat is the only one in eastern North America. Hummingbirds differ from all other birds in their mode of flight and manner of feeding. Like the swifts, which they resemble structurally, they are unable to walk on the ground like other perching birds, although they perch easily and frequently on trees, bushes and convenient power wires. As is well known, their food consists of insects and the nectar of flowers, both of which they gather from blossoms before which they poise on whirring wings.

We arrived at the Penland Handicraft School, Penland, North Carolina, in July. In the front yard were two large mimosa trees which together formed a beautiful canopy of bloom of thirty feet in diameter. There were always five or six and often as many as a dozen hummingbirds feeding about these blossoms all day long. I moved my easy chair

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\*Cocoa, Florida. Photograph by courtesy of Fish and Wildlife Service.



under this mimosa canopy and with a good pair of binoculars watched the birds carefully for several days. I found that the aggregate period of perching at least equalled and probably exceeded the aggregate period of feeding. The birds perched on twigs, small limbs, and on a power wire which extended through the branches of one of the trees. While perching they would preen themselves vigorously, and look about in a very alert manner. After feeding they would usually dart back to the same perch, flycatcher fashion.

During sustained flight all birds, to a greater or less degree, are aided materially by the pressure of air against their wings. But the hummingbird, poised in mid air, feeding, is obliged to sustain itself exclusively by its own power. This concentrated and continued effort doubtless explains the frequent rest stops made during the feeding period.

The humming sound from which the bird takes its name is seldom heard while the bird is poised before a flower, but only as it darts from one flower to another, or when the birds chase one another about in the sunshine as they frequently do while feeding together. It is apparently the sudden, darting flight which produces the humming sound.

While chasing each other the birds utter a quiet but continuous and rapid "kuck! kuck! kuck! kuck!" which is in addition to the tiny squeaks and chirps which are sometimes heard during moments of excitement.

The movements of this little bird, back and forth and up and down, from one flower lip to another, are as exact and precise as the movements of a piston. It darts rapidly to the face of a flower and stops suddenly in the exact position for feeding upon it. It never fumbles.

Also, it seldom feeds from a perch like other birds. But I discovered one hummer which was poised before a flower in the usual manner, when it discovered that there was a twig just under it upon which it might rest. It suddenly dropped its feet down to the twig, stopped its wings, and finished its feeding while perched. I never saw one feed from a perch before, even for an instant.

I saw another bird, while "hung up" before a flower, reach up with one of its claws and scratch its flank without ever missing a wing beat.

These little birds fly forward or backward, sidewise, straight up or down, all with equal facility, and the aura or haze produced by their whirling wings is frequently wider in all directions than the body itself, indicating that the comparatively long and powerful wings are so pivoted that they may be rotated in any direction with the greatest ease and rapidity.

And with all this special equipment and adaptation for daily supping nectar from a flower in your garden, this little bird, twice a year, takes off on a 500-mile, non-stop flight across the Gulf of Mexico.

Truly the hummingbird is one of the greatest marvels in the whole realm of nature.

# The Girl Who Had Never Been Bitten by a Rattlesnake

## *A Texas Folktale*

KARL PATTERSON SCHMIDT\*

Authentic folklore, with the warp of poetic truth interwoven with the woof of regional background, crystallizes in America in such areas as the North Woods, the Western Plains, the Rockies, and the New England waterfront. Texas is so independent a section of our country that it may be expected, in spite of the lamentable advance of literacy, to make a unique contribution to American folklore. I hasten to record a story with legendary qualities from the red-cedar covered hills of the Edwards Plateau, not far west of Austin, for which I am indebted to my very good friend Dr. C. S. Smith, of San Marcos Teachers College.

The city of San Marcos lies astraddle of the Balcones escarpment, where in some bygone geological age the earth's crust broke and slipped some four hundred feet, to form a great barrier across the face of Texas. The rolling and hilly cattle country of the Edwards Plateau to the north was thus left high above the level and fertile agricultural land that stretches from the escarpment to the Gulf of Mexico. Here is a sharp cultural division of the kind so evidently favorable to the growth of folklore—a sea of civilization, with its towns and cities and their schools, washing against a hinterland of hills and gullies, covered with a vast extent of open growth of scrub oak and red cedar, and honeycombed by mysterious caves. In such country a townsman, unless he were also a practiced deer hunter like Dr. Smith, might be hopelessly lost within an hour's walk of his own home. Much of the scrub country is used for cattle grazing, but there are deer and bear and catamounts, and, on the rocky limestone ledges, abundant rattlesnakes, of the Texas diamond-back species.

In the hills, a living is hard to come by, and a deer hunter after traveling all day in search of game may find himself knocking at the door of a wooden cabin with glassless windows where he would be made welcome, though not, perhaps, entirely without suspicion. My friend Smith happened upon a cabin like this in the hills where the one room with its sleeping loft housed a weather-beaten couple with nine children, and a couple of assorted grandparents and the inevitable hound dogs for good measure. It developed, on acquaintance with the family, that its members had one unique thing in common—every one, except the youngest daughter, had been bitten by a rattlesnake; and each had his own story

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\*Chief Curator of Zoölogy, Chicago Natural History Museum.



of his encounter, of his narrow escape from death, and of his gradual recovery from the fearful experience, with the inevitable monstrous black swelling, loss of blood, coma, and other symptoms. These tales, of course, were embroidered with a variety of details, such as the length of the snake, the number of ratties in its rattle, etc., etc., and supplemented with accounts of the various snake-bite cures that had been employed. Indeed, in the case of the bites long past, the distinction between truth and embroidery has long since been lost. It was immediately obvious that the possession of such a story was an invaluable social asset to every member of the family, producing an inexhaustible conversational fund, with endless argument as to whose bite had been worse and whose escape from death most near. The oldest son, indeed, a lout of twenty, was quite the hero of the group, as he had been twice bitten.

The unfortunate youngest daughter, who had never been bitten by a rattlesnake at all, naturally could take no part in the conversation, and quite obviously was a repressed child, with a growing inferiority complex. She flitted silently around the fireplace, and was already the cinderella of the family, who could go about the household duties while her more favored brothers and sisters entertained the visiting neighbor or the rare deer hunter stranger with their snake-bite experiences. Her situation in the family quite accurately resembled that of the boy who could not shudder, in another and more famous cycle of folk tales.

Dr. Smith's sympathy for the little girl had been great, and his thoughts often turned to her singular case, and to her curious variety of misfortune. We may imagine his delight at learning the sequel to her childhood life through one of the graduates of the teachers college (who, I am inclined to suspect, form an eager corps of correspondents for the good doctor). It seems that the family in the hills had quite suddenly pulled up its stakes and moved to West Texas. There the youngest daughter, being unfamiliar with the terrain, had promptly been bitten by a black-tailed rattle snake, with such excellent results for her conversational morale that she had not only overcome her early handicap, but had gone to school, and, as the only literate member of the family, had become a country school ma'am, subsequently marrying a local rancher. Is it too much to hope that their land may prove to be underlain by an oil field yet undiscovered?

# Notes from the Field

## IDENTIFICATION OF FERNS

This is an account of an amateur's experience in identifying various species of ferns; it has little to do with the *study* of the species, which is quite another matter. It can truthfully be stated, I think, that while many people admire the color, grace and symmetry of ferns comparatively few know their names.

To begin the study of ferns, the first need is a good field book. In the many available, emphasis is usually placed upon the spore-cases as among the most important differentiating characters, and apparently only one \* features the vascular bundles as a means of identification. Interest in this one feature prompted me to photograph cross-sections of the stems in color and tabulate the results of these observations in northeastern New York and northern Vermont. Much to my surprise, I found that the patterns of the vascular bundles were helping me more than a study of the spore cases.

In the diagrammatic cross-sections of the stems of various ferns (Figure 1), note the patterns of the vascular bundles in the different species. Although the bundles do not always make the identification sure, they are a good starting point. In such cases as the shield-ferns and wood-ferns, for example, which usually have patterns of fine "dots" (Figure 2), other characters must be studied. In the case of the lady-fern with "curves" (Figure 3), and the hay-scented fern with a "loop" (Figure 4), the identification is certain. These two species, which are often found together, are difficult to distinguish without inspection of the pattern of the bundles, especially in immature specimens.

Identification by means of the bundles is especially advantageous when fertile fronds with spore-cases are not available: the vascular bundles are there. In some cases, as for example with the sensitive fern and the royal fern, the original growth may have been cut off and a second-growth frond is found. At first, perhaps, one thinks of a new species, but the bundles settle the matter.

| DOTS                                                                                  | CURVES                                                                                | LOOPS                                                                                 |
|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|  -3  |  -1  |  -2  |
|  -4  |  -1  |  -3  |
|  -2  |  -1  |  -1  |
|  -1  |  -1  |  -1  |
|  -1  |  -1  |  -1  |
|  -7  |  -1  |                                                                                       |
|  -1  |  -1  |                                                                                       |
|  -3 |  -1 |                                                                                       |
|                                                                                       |                                                                                       |  -1 |

Figure 1. Different types of vascular bundles, representing 39 species of ferns. Numerals indicate the number of species with that particular type in the area studied.

Now about the point of observation. Since the pattern made by the position of the bundles in cross-section may vary in different parts of the stipe, it is best to cut the section about one inch from the ground, or the same distance from the root. A sharp knife should be used. In taking specimens for photographing I used a razor blade. In no case did I find it necessary to pull a root or destroy a plant, and this is important with rare species.

\*Waters, Campbell E. *Ferns/a Manual for the Northeastern States/with analytical keys based on the stalks and on the fructification.* New York: Henry Holt and Co., 1911.





Figure 2. Clinton's fern, with "dot-like" pattern.  
 Figure 3. Lady-fern, with "curved" pattern.  
 Figure 4. Hay-scented fern, with "loop" pattern.

With most of the common ferns the bundles are easily discerned with the naked eye, but a magnifying glass may be necessary for the small species such as the spleenworts and Woodsias. In color the bundles vary somewhat with the different species from a light to dark cream. The area around the

bundles may be grayish brown, bluish green, light green or orange. On the whole the stipe end is more colorful than one might expect. The coloring of the cinnamon fern is the most pleasing to me.

—J. M. Hollister,  
 Schenectady, N. Y.

## THEY HELP THEMSELVES

Accounts, such as that of McIlhenny, of the tendency among the herons of Avery Island, Louisiana, to rob one another of nest material, have dealt, generally, with colonial species. In cases of this kind, as with rooks—reported to practice similar raids—the birds make their depredations or their reprisals against members of their own family or of their own species. But of the same sort of thing occurring among small passerine birds I recall seeing little in ornithological literature. Hence I am led to suppose that it may be well to record certain observations of recent years having to do with this item of bird behavior.

The first instance of this activity which came to my notice was offered by a cedar waxwing which, in the absence of the parents whose clutch, evidently, was not complete, attacked the nest of a kingbird. The act was persistently repeated and, at length, the eggs fell through the bottom of the weakened structure. The next offender was a waxwing, too. Here a wood pewee was the victim, and its nest was removed piecemeal down to the last lichen.

It seems odd that the militant kingbird should be the dupe but, again last summer, its nest was the object of attack. This time it was a robin whose effort seemed to be but a single half-hearted sortie. And it was an earlier nest of this same kingbird, destroyed by causes unknown, from which a yellow warbler and an oriole had helped themselves—not, however, effecting any appreciable damage. Finally, a blue-gray gnatcatcher came frequently to the nest of a yellow-throated vireo, removing and carrying away material until the vireos abandoned the nest.

I had found once, intermixed with the sticks and debris of a red-shouldered hawk's nest, the entire nest of a wood pewee. Since the latter breeds much later than the former, doubtless the flycatcher's nest was an old one, possibly seized with the branch to which it had been attached. Except for this negative evidence of nest-removal, I had not witnessed before—though I had watched a great many birds at nest-building—an act of the kind described.

E. R. Ford

## MONARCH MIGRATION

On October 12, a migration of the monarch butterfly (*Danaus plexippus* L.) was observed at Gatlinburg, Tennessee. The day was warm with slightly overcast sky. All day the insects lazily sailed by, most of them flying high above the ground. The writer stationed himself facing an opening between two trees which were about twenty feet apart. From here, clear vision could be had up to an angle of about 75 degrees from the horizon. In ten minutes, 231 butterflies passed this view. This means nearly 1400 per hour for this small space.

As far as one could see with a pair of field glasses directed upwards, the sky was dotted with these insects. Those that could be examined close at hand appeared to be nearly all fresh and perfect, indicating that they had probably emerged not very many days before.

W. F. Henderson, Chicago

## Test Your Nature Lore

### BIRD-NAME QUIZ

*Answers to questions on page 27.*

1. Old-squaw
2. Knot
3. Wood duck
4. Sage hen (or sage sparrow)
5. Rock dove (or rock sparrow)
6. Solitaire
7. Cardinal
8. Chuck-will's-widow
9. Whip-poor-will
10. Crossbill
11. Wagtail
12. Sapsucker
13. Bull-bat (nighthawk)
14. Thunder-pump (bittern)
15. Screech (h)owl
16. Dipper
17. Fly-up-the-creek (green heron)
18. Chat

## Notes from the Field

### Junior Department

To the desks of museum curators come an infinite number of letters of the "What-is-it?" variety, but rarely does one carry a truly pristine charm. We are impelled to share the following description of a spotted salamander and the accompanying "pitcher" with our readers, and regret that we can not reproduce the chirography. Our guess on the age of our correspondent is nine.



*this is as close  
as Pitcher i can make*

"Dear Sir

I wood like to know if you can give me some information on an amaniel that i have cought out here on the farm The Amanial is some what like an Lizzard. But my Mother & My father said There are pleanty of lizzard But they neavery seen one like the one i cought if it is one. But they don't think it is. I have cought too of them. And the smallest one is 4½ inches long and the largest is 7 inches long. they have verry large eys that almost come out of there heads there color is verry Black. With dark tan spots and they have a stomach like a alligator and my Sister said it might be a Salamander. Do you think this might be so? I found them in a damp place and i an sending you As close at pitcher as i can make of him. And i was wondering if you might write me back if you Can give me some information on it? Some of my friend told me to write you people So i an incloseing a 3c stemp envlope & Paper. I thank you."

Miss .....  
....., Ill.



# The Naturalist's Book Shelf

## FLORA OF ILLINOIS

By George Neville Jones

The University Press, Notre Dame, Indiana, 1945,  
317 pages, 2 maps, glossary, bibliography, index.  
\$2.00.

Consistent with the present trend in the organization of taxonomic work, this book includes all descriptive material in the key proper. Separation of Spermatophytes from Pteridophytes is established upon differences in reproductive structures. However, the great sections of the key are based upon differences in stem, leaf, habitat, and nutrition. Within this "artificial" framework the families or their divisions, are keyed upon arbitrary criteria such as growth—form, flowers, fruit, inflorescence, etc. The key leads directly to the species without intervening family or genus delimitations. Each species listing although within the family-genus hierarchy, carries only the necessary differentiating features. There is, in addition, a notation of habitat, time of bloom, geographical distribution and disputed synonymy.

While older manuals were obliged to use more than the fundamental reproductive structures in setting up an initial key, modern manuals seem designed to "run down" the unknown species quickly and accurately regardless of kind of characters employed. Nevertheless, in a random sampling, the key here discussed has nine separate references in several categories to cover the legumes alone whereas an older work has only two. It would be interesting to compare the two methods by using them experimentally in comparable groups of students. The newer streamlined keys are not nearly so comfortable for the taxonomist unsure of himself. For him there are in the older books reassuring descriptions of genera and families by which he can back-track or confirm a tentative identification.

It is high time that Illinois assemble and publish a comprehensive flora. This is a pioneer treatise, however tardy, a book proffered as a standard when authors in general have been reluctant for too many years to undertake the task or defend their observations.

Anna Pedersen Kummer

## THE CANVASBACK ON A PRAIRIE MARSH

By H. Albert Hochbaum

The American Wildlife Institute, Washington, D. C., 1944, xii, 201 pages, 8 figures, 18 halftones, colored frontispiece and numerous drawings by the author, literature cited, index. \$3.00.

To enjoy this book the average reader needs to possess no more feeling about ducks than that sense of mystery and of reverence with which he reads Bryant's "To a Waterfowl." Its appeal to most of us will be found in the way it is written and illustrated, the artist being the author himself.

For the naturalist there are new views and new techniques, seen here as the tools of a more precise investigation of waterfowl and of other wildlife groups.

The scene of Mr. Hochbaum's four-year study was the great Delta Marsh of Manitoba, where captive birds and those of the wild could be observed almost side by side.

The organization of a duck population is complex. One learns that to make any sort of calculation as to hatching success, sex ratios, densities, and the like (all necessary to competent management planning) one must make distinctions not dreamed of save by specialists. We read that "between early April and early July on any breeding marsh one finds ducks in seven distinct categories: unmated birds not yet courting; unmated birds in prenuptial courtship; mated pairs; unmated sexually active drakes; novice drakes; summering males; unsuccessful or nonbreeding females."

To determine in which of these categories a bird should be placed the author first had to acquaint himself with all activities of the bird (on the water, in the air, in company with other birds) as well as where (with relation to one another, to the nest, to the territory) they took place. Time after time and day after day such acts, under varying conditions, had to be seen and evaluated before they became significant. Mr. Hochbaum tells how this duck-watching was done and of the factors involved in making the evaluation. The home of the Delta ducks, their seasonal flights, their nesting and brooding, their fate in the hunting season are treated as a preliminary to the final "discussion for management."

How important is management? The author, a sportsman, too, says, "It is possible, on the basis of statistics, for the people of North America to wipe out the waterfowl population in the course of one autumn under existing seasons and bag limits. The fact that this seems improbable on the basis of observed practice does not remove the burden of responsibility." It will seem to most readers, however, that, as the result of such studies as have been made by Mr. Hochbaum and others, wildlife management will always be a part of our economy and that as much success is likely to attend it as we have seen in the management of industry and of agriculture. Even it may be conjectured that, when its success is so great as to warrant the most liberal shooting laws, there will be many sportsmen who will turn their attention less to the score of the kill and more to the score of living birds.

This handsome volume has been made complete by an appendix, a list of the sources cited and informative photographs. One likes, too, the generous acknowledgments made by the author who doesn't forget Pat and Tim, the dogs who were "almost as helpful as they were eager to help."

E. R. Ford

## THE ARGASIDAE OF NORTH AMERICA, CENTRAL AMERICA AND CUBA

By R. A. Cooley and Glen M. Kohls

The University Press, Notre Dame, Indiana, 1944,  
152 pages, 57 figures, 14 plates. \$2.00.

This volume is Monograph No. 1 of the *American Midland Naturalist*. Its conception and execution does credit both to the authors and the journal. Both of the former are well known. Dr. Cooley's monograph of ixodid ticks of the genera *Dermacentor* and *Otocentor* in the United States (Bulletin 171, National Institute of Health, 1938) is the standard reference on these important ticks. This latter work on two genera of Ixodidae, in conjunction with the present article on Argasidae, serves the practical function of gathering the available facts on two families of ticks of importance to Medical Entomology.

Such an accomplishment is not only the responsibility of specialists to zoölogy, it is a real service to those of us, like the present reviewer, teaching Medical Entomology. At the present time, with our attention drawn more and more to the Pacific, it is to be hoped that other groups of arachnids and insects of medical importance (such as the Trombididae among mites) will receive similar treatment.

With respect to the ticks discussed in the present article, few groups would be more desirable at this time. The Argasidae are well known, among other things, as the taxonomic home of the genus *Ornithodoros*. This genus includes many species of ticks, and is distributed over many parts of the globe: Mesopotamia, Palestine, Spain, Morocco, central Africa, California, Panama, Columbia, and Venezuela to name but a few localities. In general, where species of *Ornithodoros* are found, they are carriers of as many distinct, microscopic, pathogens known collectively as spirochaetes (*Spirochaeta*, *Borrelia*, *Treponema*). Each species of *Ornithodoros* and spirochaete form a dangerous combination, since the



spirochaetes are etiological agents of as many kinds of relapsing fever, and the ticks vector the disease by direct inoculation (just as the ixodid ticks over the world appear to be excellent vectors of certain virus diseases).

The volume by Cooley and Kohls, therefore, becomes an important reference in Medical Entomology as well as a contribution to American biology. The book covers the known argasid ticks of North and Central America, and a part of the Antilles. Following a short introduction, and a short discussion of the medical and veterinary aspects of Argasidae, there are six pages of especial value to the student.

These latter deserve the attention of the interested reader. About four pages are devoted to an explanation of technical terms used in the taxonomic keys and generic and species descriptions which compose a large part of the book. These terms are clearly defined, most of them are illustrated, and this consequently should render subsequent use of the keys and descriptions purposeful. At least the authors have dealt fairly with their prospective readers. This section on terminology is followed by a short but helpful section on methods of study of the Argasidae, in which directions and suggestions are given on the type of equipment necessary, illumination of specimens, preserving fluids, dissection, and the rearing of ticks.

The balance of the book (pages 11 to 126) is a consecutive taxonomic account of the family Argasidae in the zoögeographic region covered. Each of the four genera (*Argas*, *Ovobius*, *Ornithodoros*, and *Antricola*) is defined, the critical literature cited, the genotype stated, and a key to the species (with page numbers) set forth. Each species is discussed and illustrated.

With respect to the species discussions, each is followed by citations to the critical literature, a full description of at least the sexually mature adult, the zoögeography of the species as far as known, and the hosts of the tick. The reviewer was pleased with the illustrations of the species. The twenty-five

species covered, illustrated by numerous line-drawings of special parts of the body, should be distinguishable if the authors' directions and care are used. In addition to these accurate, unshaded drawings, there are distributional maps, fourteen plates of photographed argasids, and two taxonomic lists.

The first of these lists is a classified list of hosts and their respective argasid ectoparasites. The second is a zoögeographic list of the distribution of the ticks studied, by countries.

The volume closes with a five page bibliography, and a short index. This is a well-bound book, of attractive format, and the evident care which has been taken in its preparation should insure it against ineffectiveness.

Orlando Park  
Northwestern University

## TOO MUCH SALT AND PEPPER

By Sam Campbell

Bobbs-Merrill Company, Indianapolis, 1944, 258 pages, pen and ink sketches by Will Forrest. Cloth binding \$2.00.

In the same friendly manner as in his movie-lectures, Sam Campbell, "the Philosopher of the Forest," again presents in book form his philosophy of living—with nature, with others, and with ourselves. *Too Much Salt and Pepper* is a continuation of the story, setting, and philosophy of Mr. Campbell's first book with a porcupine hero, *Hou's Inky* (reviewed in *The Chicago Naturalist*, vol. 6, p. 103). It contains somewhat less narrative and more ethical instruction than its predecessor, emphasizing the experiences through which Carol, a high school girl from the city, found exemplified in nature the principles of individual responsibility, serenity, and naturalness.

"Inky," "Halitosis" the skunk, and—most of all—the mischievous young porcupines, "Salt" and "Pepper," are among the animal characters whose distinctive personalities and behavior make Carol's visit at Wegimind, the Campbell's animal sanctuary in the north woods, entertaining and instructive in both nature lore and character-building.

Harriet M. Smith

# Museum Activities

## New Publications

The Academy announces the publication of two new technical papers by Dr. Orlando Park, professor of zoölogy at Northwestern University, member of the Board of Scientific Governors and honorary curator of zoölogy at the Academy: "A Preliminary Study of the Pselaphidae (Coleoptera) of the Guianas," *Bulletin*, volume 7, number 6, pages 277-327, plates 1-7, published June 14, 1945, price \$0.60; and "Further Studies in Pselaphidae (Coleoptera) of Mexico and Guatemala," *Bulletin*, volume 7, number 7, pages 331-443, plates 1-11, price \$1.25. These important contributions to systematic entomology and zoögeography are available to active members without charge upon request.

Dr. Park is the world's foremost student of the Pselaphidae (ant beetles). He is preparing a non-technical article on the natural history of these interesting insects for publication in *The Chicago Naturalist*.

## Recent Visitors

Distinguished visitors at the museum during recent weeks were Dr. William M. Clay, professor of biology, University of Louisville; Reed B. Harkness, secretary, St. Louis Academy of Science; Nathan L. Mohler, artist, State Museum, University of Nebraska; Dr. W. Armstrong Price, geologist, Corpus Christi, Texas; Professor Manuel Maldonado, National Polytechnic Institute, Mexico City, now a Guggenheim Fellow at the University of Kansas; Dr. Edwin Lincoln Moseley, professor emeritus and director of the museum, Bowling Green State University, Bowling Green, Ohio; Florian V. Crete, C. S. V., director of the museum, Institute for the Deaf, Montreal; and Dr. Henrique da Rocha-Lima, director, Instituto Biologico, Sao Paulo, Brazil.

## Summer Exhibits in Lobby

Displayed in the museum lobby this summer are a series of bird portraits by the Reverend John W. Baechle of Collegeville, Indiana, and a special exhibit, "Garden Family Album," prepared under the supervision of Miss Harriet M. Smith.

Mr. Baechle's close-up studies of the heads of some of our local birds was made in conjunction with his bird-banding program at St. Joseph's College. So much of the personality of each species—the defiance of the marsh hawk, the curiosity of the blue jay and owl, the reticence of the phoebe, or the good-humored fussiness of the titmouse—is demonstrated in the tilt of the head, the fluffing of feathers, or the opening bill, that these are literally "portraits" in the same sense as are studio photographs of human faces.

"The Garden Family Album" displays colored pictures of garden flowers, vegetables, and fruits along with their local relatives. Each giant album sheet is devoted to one of fifteen plant families prominent in home gardens of Chicagoland, and is surrounded by a colorful border of seed packets which gives an impression of the proportional representation of that family among domesticated species developed by seed growers from wild plants all over the world.

The Academy is indebted to the Stecher-Traung Lithograph Corporation for a full set of nearly 800 seed envelopes, and to the Art Room of the Chicago Public Library for the long-term loan of a number of attractive floral plates. Color plates of wild flowers were selected from the H. D. House portfolio published by the New York State Museum.

## Children's Programs Well Attended

The third spring series of six nature movie programs for children, April 21 through May 26, had an average attendance of 207—forty more per program than last year—and a total attendance of 1214.

The roster of youngsters who have asked when there will be "some more movies for kids" has now assumed the proportions of a junior mailing list, and there were many multi-folded and dog-eared copies of the printed program ostentatiously dug out of pockets at the first "show" by veterans of of last year's series. A number of these "regulars" have been coming in during the summer with a nature question or a perforated box, bag, or jar containing a moth, chunk of iron pyrite, or other specimen which they have diffidently offered to the museum.

The Academy appreciates the coöperation of the Chicago Board of Education in lending some of the splendid sound films from its department of visual education, and in listing the programs in the Superintendent's Bulletin to teachers who have announced them to their classes.

## Affiliated Societies Resume Meetings in Fall

The following meetings have been arranged for September and October. Those marked with an asterisk will be of special interest to the public.

*Marquette Geologists Association:* Saturday, September 8, 8 P. M. Discussion of weather instruments by Mr. Sumi and continuation of "Easy Lessons in Geology" by Dr. John R. Ball.

*\*Burnham Astronomical Society:* Tuesday, September 11, 8 P. M. "Seeing the Universe," a lecture and moving picture by Dr. Oliver Justin Lee of Dearborn Observatory, Northwestern University. A summary of the September evening sky by C. L. Baker.

*Amateur Herpetologists Club:* Tuesday, September 11, 8 P. M. Program to be announced.

*Chicago Entomological Society:* Sunday, September 16, 2 P. M. Program to be announced.

*\*Illinois Audubon Society:* Friday, October 19 (or October 26), 8 P. M. "Nature's Calendar," motion picture in color, by Earl G. Wright, Neville Public Museum, Green Bay, Wisconsin.

## Personals

Dr. Eliot C. Williams, Jr., assistant to the director on military leave, has been promoted to the rank of captain in the Chemical Warfare Division at Army headquarters in Hawaii.

Dr. John R. Ball, a member of the Board of Scientific Governors and honorary curator of paleontology at the Academy, has recently been advanced from associate professor to professor in the department of geology and geography at Northwestern University.

Gordon Pearsall, formerly curator of the Trilside Museum of the Cook County Forest Preserve District in River Forest, has been appointed an inspector in plant quarantine, Division of Entomology, U. S. Department of Agriculture, and is now stationed in Honolulu.

W. A. Bevan, formerly of Long Beach, California, has joined the staff of the Academy as an assistant in the shop and laboratory.

Members who have attended Norman Hallock's movie lectures on the Northwest may be interested in knowing that he is spending his vacation making color motion pictures at Jasper National Park in the spectacular Canadian Rockies. He expects to have his new program ready for the Academy's Sunday afternoon series this winter.





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Special Publication Number 5

## Mushrooms of the Great Lakes Region

By

Verne O. Graham, Ph. D.

*Honorary Curator of Mycology  
Chicago Academy of Sciences*

A manual of the fleshy, leathery and woody fungi of Illinois, Indiana, Ohio, and the southern half of Wisconsin and of Michigan.

For the amateur as well as the professional naturalist, this book is intended to furnish means for identifying the species of Ascomycetes and Basidiomycetes of the area covered. A key to genera is followed by a systematic treatment of more than 1200 species. There are keys to the species of all larger genera. Each species is characterized briefly and its habitat and geographic range stated. *Those of known edibility are indicated.* Descriptive terms are defined in a glossary and scientific names, including synonyms, are indexed.

The illustrations, 868 figures in 49 plates, were carefully drawn under the supervision of the author and handsomely printed by collotype.

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Published jointly by the Academy and the Chicago Natural History Museum (formerly Field Museum), vii + 390 pages, 49 plates, paper cover, June, 1944. Price \$4.10 post-paid in U. S.

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